**Small Business Innovation Research/Small Business Tech Transfer**

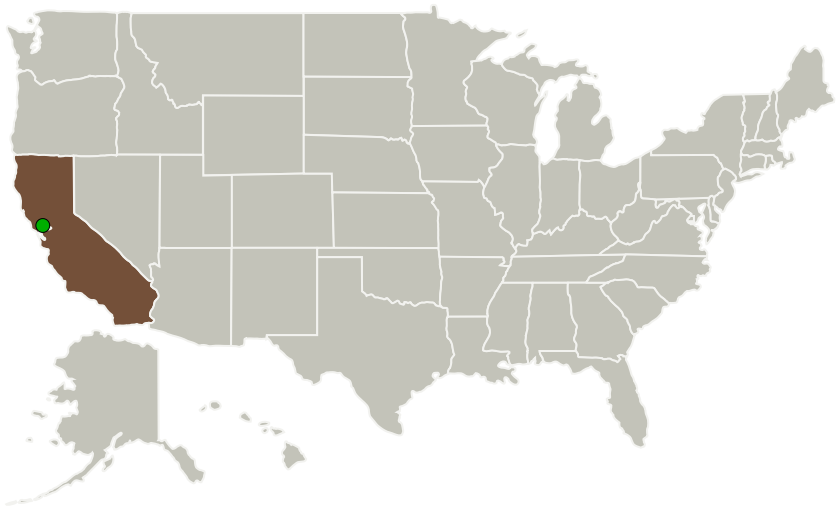
# Collective Inference based Data Analytics System for Post Operations Analysis, Phase I

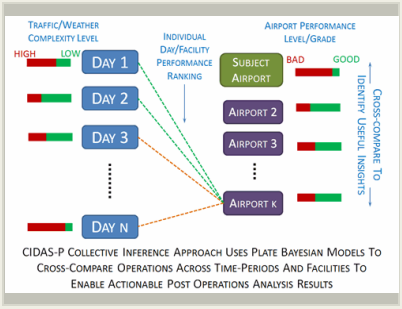
Completed Technology Project (2017 - 2017)

## Project Introduction

Current-day capabilities for performing post operations analysis (POA) of air traffic operations at airports, airlines and FAA facilities are mostly limited to creating reporting type of analysis results which compare mean values of key performance indicators against the respective expected nominal levels (e.g., average daily delay). This single point comparison method does not directly enable a POA analyst to identify the root-cause for a particular observed inefficiency, nor does it help in identifying a solution for mitigating that inefficiency. This SBIR develops a machine learning based approach for improving POA and for potentially making it more autonomous. We call this tool Collective Inference based Data Analytics System for POA (CIDAS-P). CIDAS-P will provide airport, airline, FAA and NASA personnel with a fast, flexible and streamlined process for analyzing the day-of-operations, rapidly pinpointing exact causes for any observed inefficiencies, as well as recommending actions to be taken to avoid the same inefficiencies in the future. It does this by developing an innovative, collective inference algorithm for cross-comparing performance of the same facility on different days as well as cross-comparing performance across different facilities. The algorithm leverages sophisticated probabilistic modeling techniques that consider the subtle nuances by which cross-facility and cross-day operational scenarios differ to enable apples-to-apples comparisons across traffic scenarios and identify what works well and what does not in similar situations. User acceptance of NASA Trajectory Based Operations research products stands to benefit from CIDAS-P because CIDAS-P's automated recommendations can help identify and fix problems with these products early on in their deployment life-cycle.

## Primary U.S. Work Locations and Key Partners






Collective Inference based Data Analytics System for Post Operations Analysis, Phase I Briefing Chart Image

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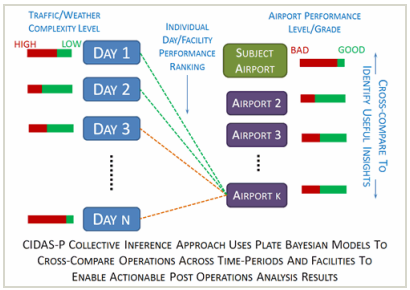
| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ATAC | Lead Organization | Industry | Santa Clara, California |
| Ames Research Center(ARC) | Supporting Organization | NASA Center | Moffett Field, California |

| Primary U.S. Work Locations |
|---|
| California |

## Images




**Briefing Chart Image**
Collective Inference based Data Analytics System for Post Operations Analysis, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/134344)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
ATAC

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

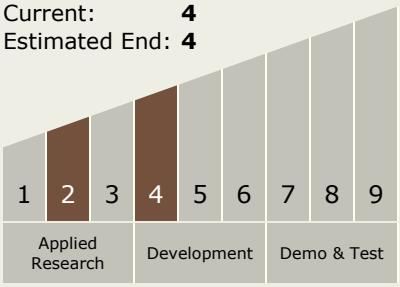
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Jason L Bertino

## Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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## Technology Areas

**Primary:**

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System